

REMARKS

Claims 1-4 and 9-19 remain pending in the application. It is proposed to amend claims 1-4, 9-10, 12-17, and 19 without introduction of new matter. Entry of the proposed amendments and favorable reconsideration are respectfully requested in view of the following remarks.

The courtesy extended to Applicants' representative by the Examiner and his Supervisor in a telephonic interview conducted on October 7, 2008 is noted with appreciation. During that interview, the parties discussed whether features defined by Applicants' independent claims are in fact disclosed by the prior art applied in the rejections. No agreement was reached. Applicants believe that this is due to the parties' attributing substantially different meanings to the word "connection" that is used in Applicants' claims. Applicants believe that the meaning adopted by the Office is inconsistent with the requirement that claim terms be given their broadest reasonable interpretation in light of the specification. See, e.g., MPEP §2111.01. Nonetheless, in the interest of expediting favorable prosecution of the application, it is proposed to amend the claims in a way that eliminates having to interpret the term "connection" when deciding the patentability of the claimed subject matter. This is discussed in greater detail below.

Claims 1-4, 9-10, and 12-17 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Cansever (US Patent No. 6,678,252) in view of Toh C-K ("Associativity-Based Routing for Ad-Hoc Mobile Networks" -- henceforth "Toh C-K"). This rejection is respectfully traversed.

As discussed above, it is believed that the reason for the parties' disagreement over the relevance of Cansever and Toh C-K derives from their differing interpretations of the word "connection" as recited in the claims. Therefore, in order to expedite favorable prosecution of the application, it is now proposed to amend independent claim 1 to now recite "means for determining a route between the source node and the destination node by forming and/or reforming one or more new connections associated with one or more newly formed subnetworks if it is determined in response to determining that said request for route discovery between the source node and the destination node over existing ~~network connections~~ subnetworks fails." Independent claims 9 and 12 would be similarly amended, and dependent claims 2-4, 10, 13-17, and 19 would be amended to ensure consistency between their language and the revised language of their respective independent base claims.

Support for the source node “determining a route between the source node and the destination node by forming and/or reforming one or more subnetworks in response to determining that said request for route discovery between the source node and the destination node over existing subnetworks fails” can be found in the original specification at, for example, page 9, paragraph 47 through page 10, paragraph 0050, keeping in mind the explanation on page 12, paragraph 0060 that the invention is not limited exclusively to Bluetooth scatternets that are made up of so-called piconets, but is more generally applicable to communications systems comprising multiple networks.

Entry of the above proposed amendments is respectfully requested. These amendments were not previously presented because Applicants were not earlier aware of the different meaning of the term “connection” being used by the Office. It is believed that these amendments are necessary to enable the Office and Applicants to eliminate disagreements over the meaning of claim terms.

The Office rightly acknowledges (e.g., in the Office Action text spanning pages 3 and 4) that Cansever fails to disclose establishing a route between the source node and the destination node over one or more new connections associated with one or more newly formed subnetworks. The Office relies on Toh C-K as making up for this deficiency. This reliance is unfounded for at least the following reasons.

The invention relates to establishing a route from a source to a destination in an ad-hoc network telecommunications system. In a system that, for example, utilizes Bluetooth® technology, establishing a route from a source to a destination typically involves the source node broadcasting a REQUEST message which requests a route to a stated destination. All nodes that are within range receive this REQUEST message. A node that receives the REQUEST message but is neither the destination node nor a node with a valid route to the destination node, will rebroadcast the REQUEST message to its neighbors. When the destination node, or a node with a valid route to the destination node receives the REQUEST message, it limits network flooding by not rebroadcasting the REQUEST message, and it sends a Unicast REPLY message back to the source node.

As explained in the Background section of the instant application, typically, the source node uses the first reply message received, and it only requests a new route when the actual route breaks.

The Bluetooth specification has the INQUIRY and PAGE procedure to establish piconets but, at least at the time of the invention, failed to describe how these can be used to

form efficient scatternets. Moreover, solutions at the time of the invention did not provide a procedure for nodes that have packets to send to a destination, wherein these nodes are not members of any piconet.

Embodiments defined by, for example, independent claim 1 address these issues by including various means that broadcast a route discovery request message for a route between the source node and the destination node over one or more existing subnetworks; determine whether the request for route discovery between the source node and the destination node over existing subnetworks fails; and determine a route between the source node and the destination node by forming and/or reforming one or more subnetworks in response to determining that the request for route discovery between the source node and the destination node over existing subnetworks fails.

Independent claims 9 and 12 each define similar features.

Applicants' variously claimed embodiments are believed to be patentably distinguishable over any combination of Cansever with Toh C-K at least because neither of these documents discloses or suggests "means for determining a route between the source node and the destination node by forming and/or reforming one or more subnetworks in response to determining that said request for route discovery between the source node and the destination node over existing subnetworks fails". (Emphasis added.)

As mentioned earlier, the Office rightly acknowledges that Cansever fails to disclose establishing a route between the source node and the destination node over one or more new connections associated with one or more newly formed subnetworks. However, the Office relies on Toh C-K as making up for this deficiency.

This reliance is unfounded because Toh C-K discloses an associativity-based routing technique for ad-hoc networks, wherein a node's associativity states imply periods of stability. Toh's technique comprises three phases: A route discovery phase, a route reconstruction phase, and a route deletion phase. (See, e.g., Toh C-K at page 113, Section 5.)

The route discovery phase consists of a broadcast query (BQ) and an await reply (REPLY) cycle. A node desiring a route to the DEST broadcasts a BQ message, which is propagated throughout the ad-hoc mobile network in search of mobile hosts (MHs) which have a route to the destination (DEST). (See, e.g., Toh C-K at page 113, Section 5.1.) Once the BQ query has been broadcast by the source (SRC), all intermediate nodes (INs) that receive the query will check if it has previously processed the packet. If affirmative, the query packet will be discarded, otherwise the node will check if it is the destination. If it is

not the destination, the IN appends its MH address/identifier at the IN IDs field of the query packet and broadcasts it to its neighbors. The associativity ticks with its neighbors will also be appended, along with its relaying load, link propagation delay and the hop count. (See, e.g., Toh C-K at page 114, first complete paragraph.)

Eventually, the DEST will, at an appropriate time after receiving the first BQ packet, know all the possible routes and their qualities. It can then select the best route and send a REPLY packet back to the SRC, via the route selected. (See, e.g., Toh C-K at page 114, last paragraph.)

Of great relevance to this discussion is how Toh C-K deals with the situation in which the SRC does not receive a timely reply to its BQ. Toh C-K, on page 115, second paragraph, describes this as follows:

There may be some rare instances when the SRC never receives DEST's REPLY because of some unexpected "not-yet-selected" INs' movement. In such circumstances, the SRC will eventually BQ-TIMEOUT and sends another BQ query. Since the downstream neighbour of the migrating IN realizes the associativity change, it will send a RN[STEP=1] (Route Notification) packet in the downstream direction, deleting all the downstream nodes invalid routing table entries. Another situation occurs when a selected IN moves while the REPLY propagation is still in progress. The upstream neighbour of the migrating node will perform a LQ[H] (Localised Query) process to discover a new partial route, while the downstream neighbour sends a RN[1] packet towards the DEST, thereby erasing all invalid downstream nodes' routing entries. Hence, while the RRC is in progress, the REPLY packet continues to propagate towards the SRC.

(Emphasis added.)

It can be seen that, in each case, Toh C-K handles the situation merely by attempting some form of repeated BQ query. Nothing in this teaching describes or even suggests that an attempt will be made to "form[] and/or reform[] one or more subnetworks in response to determining that said request for route discovery between the source node and the destination node over existing subnetworks fails", as variously defined in Applicants' claims.

The Office attempts to support its rejection, in part, by relying on Section 5.1 of Toh C-K. However, it should be apparent from the above discussion that this section of Toh C-K does not in any way disclose or suggest forming or reforming new subnetworks.

The Office further attempts to support its rejection by arguing that Toh C-K shows this feature in Section 5.2.4 wherein partition of subnets due to the migration of a subnet-bridging MH and source invoking BQ query messages are mentioned. With all due respect, Applicants do not see how this can be so because Section 5.2.4 of Toh C-K merely describes the case in which the migration of a subnet-bridging MH beyond the radio coverage of its neighboring MHs will cause the mobile subnet to be partitioned. If an existing route does not span across the fragmented subnets, the route is not affected and only the subnet-bridging MH's upstream and downstream neighbors need to update their route and associativity entries. All other MHs remain ignorant and do not perform any route updates.

As for the case in which a subnet-bridging MH's migration does affect an existing route, Toh C-K has this to say:

However, if existing routes span across subnets (i.e. the subnet-bridging MH is an IN of the route), then the route is invalidated as the DEST is no longer reachable, despite any LQ or BQ attempts. *Under such circumstances, the LQ-RN cycle will eventually inform the SRC about the partitioning and the SRC can then invoke BQ query several times or it can inform the mobile user about the partitioning and prompt him to try later.*

(Emphasis added.)

(Toh C-K at page 117, last paragraph.)

Once again, Toh C-K merely describes repeating the BQ query process in the event of a failure. Applicants have not found anything in this or any other part of Toh C-K that describes or suggests “determining a route between the source node and the destination node by forming and/or reforming one or more subnetworks in response to determining that said request for route discovery between the source node and the destination node over existing subnetworks fails”, as defined by Applicants' claims.

Thus, even if the teachings of Cansever were to be combined with those of Toh C-K, that combination would still lack at least the above-recited feature.

During the above-referenced telephonic interview, the Examiners repeatedly relied on Toh C-K at section 5.2.4 which, as mentioned above, describes what happens when an existing subnet is partitioned into two new subnets due to the migration of a subnet-bridging MH (IN) and the source responding by invoking BQ query messages. Reliance on this aspect of Toh C-K cannot support the existing rejections for at least the following reasons:

1. As more completely explained above, Toh C-K does not describe the BQ query message causing subnetworks to be formed or re-formed, as defined by Applicants' claims.
2. Even if Toh C-K at section 5.2.4 can be considered to describe a subnetwork being formed or reformed, *this is not done* "in response to determining that said request for route discovery between the source node and the destination node over existing subnetworks fails", as defined by Applicants' claims. Rather, Toh C-K section 5.2.4 describes a situation in which an already existing route through one or more subnetworks is unintentionally disrupted due to movement of one of the intermediate nodes. This partitioning of an existing subnet into two new subnets is completely independent of any request for route discovery. **Moreover, the actions described in Toh C-K occur in the complete reverse order of what Applicants are claiming: In Toh C-K, the conventional BQ query message is invoked in response to the unintentional formation of two new subnets.** And, as mentioned above, Toh's conventional BQ query message does not result in the formation or reformation of subnetworks, but rather merely establishes a route over already-existing subnetworks.

For at least these reasons, the subject matter defined by independent claims 1, 9, and 12, as well as that defined by their respective dependent claims 2-4, 10, and 13-17, is believed to be patentable to Applicants. Accordingly, it is respectfully requested that the rejection of these claims under 35 U.S.C. § 103(a) be withdrawn.

Claims 11 and 18-19 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Cansever in view of Toh C-K and further in view of Zyren (US Patent No. 6,377,608). This rejection is respectfully traversed.

Claim 11 depends from independent claim 9, and Claims 18-19 depend from independent claim 12. Consequently, these claims are patentably distinguishable over any combination of Cansever and Toh C-K for at least the reasons set forth above. Zyren fails to make up for the deficiencies of Cansever and Toh C-K, so that any combination of Cansever with Toh C-K and Zyren would still fail to include at least "means for establishing a route

between the source node and the destination node by forming and/or reforming one or more subnetworks in response to determining that said request for route discovery between the source node and the destination node over existing subnetworks failed” (independent claim 9) or “means for establishing a route between the source node and the destination node by forming and/or reforming one or more subnetworks in response to determining that a timely reply message was not received” (independent claim 12).

The Office does not argue to the contrary, but merely relies on Zyren as allegedly disclosing ad-hoc networks comprising Bluetooth® radios.

For at least the foregoing reasons, the subject matter defined by claims 11 and 18-19 is believed to be patentably distinguishable over any combination of Cansever with Toh C-K and Zyren. Accordingly, it is respectfully requested that the rejection of claims 11 and 18-19 under 35 U.S.C. §103(a) be withdrawn.

The application is believed to be in condition for allowance. Prompt notice of same is respectfully requested.

Respectfully submitted,
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